United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Montana State Office
222 North 32nd Street
P.O. Box 36800
Billings, Montana 59107-6800

IN REPLY TO:

SDR-922-94-03
NDM 2284 ACQ
3165.3 (922.5)

December 15, 1993

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

DECISION

Mr. Thomas M. Ellzey)
Enterprise Energy, Inc.)
P.O. Box 208 SDR No. 922-94-03
Huntsville, Texas 77342-0208)

AFFIRMED

Enterprise Energy Inc. (EEI) requested a State Director Review (SDR) (Enclosure 1) on October 27, 1993, regarding the additional plugging requirements included as a Condition of Approval (COA) to the Notice of Intent To Abandon (NIA) the Federal 24-33 well located in sec. 24, T. 148 N., R. 105 W., McKenzie County, North Dakota. The request mistakenly identified the location of the well as T. 147 N., R. 104 W. In addition to the SDR request, EEI also requested a meeting on November 3, 1993, concerning this matter. The letter further stated that a second letter would be submitted detailing EEI's supporting arguments.

On November 3, 1993, this office met with the President of EEI, Morris Waller, and Thomas Ellzey, Consulting Petroleum Engineer. Enterprise Energy, Inc. stated that the additional plugging requirements imposed on EEI by the Dickinson District Office (DDO) were unnecessary. No written data was provided to the Bureau of Land Management (BLM) at the meeting by EEI. There were discussions on general geology and well log analysis of the Federal 24-33 well and other surrounding wells. The meeting ended with the understanding that EEI was going to submit supporting arguments on their SDR request.

On November 29, 1993 (Enclosure 2), this office received a telefaxed copy of EEI's supporting arguments. This SDR request is considered complete and timely filed in accordance with 43 CFR 3165.3(b).

Enterprise Energy, Inc. objects to the DDO's additional plugging requirement of a squeeze at the base of the Mowry shale included as a COA to the NIA approved on October 1, 1993, for the Federal 24-33 well as unnecessary (Enclosure 3). The original NIA submitted by EEI specified the placement of a 15-sack balance plug at 5100 feet; however, in a letter dated November 27, 1993, EEI asked that the requirement of a squeeze at the base of the Mowry shale be waived and a 20-sack balance plug across the top of the cement (TOC) at 5100 feet be used in its place. Enterprise Energy, Inc. also stated that the plugging requirements between the North Dakota Industrial Commission (NDIC) and the DDO for this well were different. The NDIC approved the placement of a 15-sack balance plug across the TOC defined by the Cement Bond Log (CBL) as 5100 feet (Enclosure 4); the DDO modified the balance plug, and required that EEI perforate the 5½-inch production casing, set a retainer within the 5½-inch production casing, and squeeze 150 feet of cement in the annulus in order to prevent migration of fluids into shallower formations behind the production casing. In addition, EEI was also required to place a minimum of 150 feet of cement within the 5½-inch production casing upon which 100 feet of cement would be displaced below the retainer, leaving 50 feet on top of the retainer.

On November 30, 1993, this office, along with representatives of the DDO, met with the NDIC in Bismarck, North Dakota, to discuss the plugging and abandonment requirements of the NDIC and the BLM. The NDIC considers the Newcastle sandstone as a member of the Dakota group and an exempted aquifer to be used for saltwater disposal requiring protection. The NDIC stated that the entire Dakota group must be isolated in order to prevent the migration of fluids to shallower formations and to prevent further degradation of the quality of water into shallower formations. The NDIC considers the formations between the top of the Newcastle sandstone and the base of the Fox Hills as shales, and believes that a plug between those formations is necessary. The NDIC stated that the plug, placed at the casing stub at approximately 1700 feet on the Federal 24-33 well, is sufficient to isolate any fluids from migrating to shallower formations.

In EEI's additional supporting arguments found in the November 27, 1993, letter, EEI states that the Newcastle sandstone is very poorly developed in the Federal 24-33 well with only thin streaks of a limey shaley porosity. Also, EEI stated that the Newcastle sandstone will never be used for a disposal zone, and that the requirements of a disposal zone are: a thick uniform continuous section, wide areal extent, and high porosity and permeability. Further, EEI stated that the Newcastle sandstone met none of these requirements in the Mondak Field except in a few isolated cases where a channel sand may possibly be present.

Enterprise Energy, Inc. did not provide any evidence to support its statement that the Newcastle sandstone is very poorly developed in the Federal 24-33 well with only thin streaks of a limey shaley porosity. Our review of the well logs for the Federal 24-33 well and surrounding wells in Ts. 147-148 N., Rs. 104-105 W., plus one well in Montana just west of sec. 22 T. 148 N., R 105 W. concluded that the Newcastle sandstone is continuous in the area.

Enclosure 5 is an isopach map contoured on 20-foot intervals which depicts the net sandstone feet of 12 percent or greater porosity in the Newcastle sandstone within this area. Our analysis of the area surrounding the Federal 24-33 well concludes that indeed the Newcastle sandstone is well developed and continuous. Furthermore, it is relatively clean, and sufficiently thick and porous such that there are 18 square miles of sand greater than 30 feet thick with porosities between 12 to 25 percent. The well log for the Federal 24-33 well shows 11 feet of sandstone in three zones which exhibit this porosity (Enclosure 6). Potentially, injection of produced water could occur in the surrounding Newcastle sandstone, and fluids could migrate to the shallower formations in the Federal 24-33 well if there is no plug across the Mowry shale.

The DDO's requirement to perforate, set a retainer, and squeeze cement into the base of the Mowry shale was due to the fact that the TOC behind the production casing did not extend across the Newcastle sandstone and into the Mowry shale. The CBL on the Federal 24-33 well identifies the estimated TOC at approximately 5100 feet. The Newcastle sandstone is located at a depth of 4957 feet and the Mowry shale is located at a depth of 4800 feet. These formations are identified by the State of North Dakota as part of the Dakota group which consists of the Mowry shale, Newcastle sandstone, Skull Creek shale, and Inyan Kara sandstone. The Newcastle sandstone, which is the uppermost porosity interval in the Dakota group, and Inyan Kara sandstone have been approved as saltwater disposal zones under the State of North Dakota's Exempted Aquifer Application which was approved by the Environmental Protection Agency (EPA) (Enclosure 7). No disposal of saltwater has occurred into the Newcastle sandstone of the Dakota group at this time; however, the sandstone has been approved by the EPA and the NDIC as a potential disposal zone, and must be isolated to prevent migration of fluids. With the difference in hydrostatic pressure from the Newcastle sandstone to shallower formations (Greenhorn and Eagle), the fluids within the Newcastle sandstone have the potential to migrate to shallower zones. The quality of the water in the Newcastle sandstone contains saline waters with total dissolved solids greater than 10,000 ppm; therefore, it is critical to ensure that these fluids do not migrate uphole and contaminate the Greenhorn and Eagle Formations. The Greenhorn and Eagle Formations have been identified through well log analysis as porous zones where fluids could potentially migrate into from deeper zones behind the pipe. The fluids must be contained within the Newcastle sandstone and be prevented from migrating.

Therefore, it is our finding that the DDO's decision for requiring perforation of the casing, setting a retainer, and squeezing cement at the base of the Mowry shale is technically and procedurally correct and represents appropriate requirements for this particular situation.

We hereby affirm the COA attached to the NIA on the Federal 24-33 well located in the SW¼SE¼ sec. 24, T. 148 N., R. 105 W., McKenzie County, North Dakota, regarding the requirement to perforate, set a retainer, and squeeze cement at the base of the Mowry shale.

This decision may be appealed to the Board of Land Appeals, Office of the Secretary, in accordance with 43 CFR 3165.4, 4.411, 4.413 and Form 1842-1 (Enclosure 8). If an appeal is taken, a Notice of Appeal must be filed in the Montana State Office at the above address within 30 days from receipt of this decision. A copy of the Notice of Appeal and any statement of reasons, written arguments, or briefs must also be served on the Office of the Solicitor at the address shown on Form 1842-1. It is also requested that a copy of any statement of reasons, written arguments, or briefs be sent to this office. The appellant has the burden of showing that the decision appealed from is in error.

T. P. Lonnie

Thomas P. Lonnie
Deputy State Director
Division of Mineral Resources

8 Enclosures
1 - Enterprise SDR, dated October 27 1993 (1 pp)
2 - Enterprise Supporting Documentation, dated November 27, 1993 (2 pp)
3 - NIA dated September 16, 1993 (2 pp)
4 - NDIC NIA dated September 1, 1993 (1 p)
5 - Isopach Map of Newcastle (1 p)
6 - Federal 24-33 Well Log (1 p)
7 - North Dakota Exempted Aquifer Application (3 pp)
8 - 43 CFR 3165.4, 4.411, 4.413, and Form 1842.1 (4 pp)

cc: (w/o encls.)
American Oil and Gas Corporation, P.O. Box 8348, Denver, Colorado 80201
Hamill Energy Company, 1021 Main Street, Suite 2306, Houston, Texas 77002
Kerr-McGee Corporation, P.O. Box 25861, Oklahoma City, Oklahoma 73125
Koch Exploration Company, P.O. Box 2256, Oklahoma City, Oklahoma 67201
Read and Stevens Inc, P.O. Box 1518, Roswell, New Mexico 88201
Wiser Oil Company, P.O. Box 192, Sistersville, West Virginia 26175
Estelle R. Wolf, P.O. Box 1714, Denver, Colorado 80201
WTN Discovery USA, P.O. Box 15457, San Luis Obispo, California 93406
Wesley D. Norton, Director, North Dakota Industrial Commission, Oil and Gas Division, 600 East Boulevard, Bismarck, North Dakota 58505 (w/encls.)